FIG. **24** shows an example network arrangement according to an embodiment of the disclosed subject matter. One or more clients **10**, **11**, such as local computers, smart phones, tablet computing devices, and the like may connect to other devices via one or more networks **7**. The network may be a local network, wide-area network, the Internet, or any other suitable communication network or networks, and may be implemented on any suitable platform including wired and/or wireless networks. The clients may communicate with one or more servers **13** and/or databases **15**. The devices may be directly accessible by the clients **10**, **11**, or one or more other devices may provide intermediary access such as where a server **13** provides access to resources stored in a database **15**. The clients **10**, **11** also may access remote platforms **17** or services provided by remote platforms **17** such as cloud computing arrangements and services. The remote platform **17** may include one or more servers **13** and/or databases **15**. One or more processing units **14** may be, for example, part of a distributed system such as a cloud-based computing system, search engine, content delivery system, or the like, which may also include or communicate with a database **15** and/or user interface **13**. In some arrangements, an analysis system **5** may provide back-end processing, such as where stored or acquired data is pre-processed by the analysis system **5** before delivery to the processing unit **14**, database **15**, and/or user interface **13**.

Various embodiments of the presently disclosed subject matter may include or be embodied in the form of computer-implemented processes and apparatuses for practicing those processes. Embodiments also may be embodied in the form of a computer program product having computer program code containing instructions embodied in non-transitory and/or tangible media, such as hard drives, USB (universal serial bus) drives, or any other machine readable storage medium, such that when the computer program code is loaded into and executed by a computer, the computer becomes an apparatus for practicing embodiments of the disclosed subject matter. When implemented on a general-purpose microprocessor, the computer program code may configure the microprocessor to become a special-purpose device, such as by creation of specific logic circuits as specified by the instructions.

Embodiments may be implemented using hardware that may include a processor, such as a general purpose microprocessor and/or an Application Specific Integrated Circuit (ASIC) that embodies all or part of the techniques according to embodiments of the disclosed subject matter in hardware and/or firmware. The processor may be coupled to memory, such as RAM, ROM, flash memory, a hard disk or any other device capable of storing electronic information. The memory may store instructions adapted to be executed by the processor to perform the techniques according to embodiments of the disclosed subject matter.

The foregoing description, for purpose of explanation, has been described with reference to specific embodiments. However, the illustrative discussions above are not intended to be exhaustive or to limit embodiments of the disclosed subject matter to the precise forms disclosed. Many modifications and variations are possible in view of the above teachings. The embodiments were chosen and described in order to explain the principles of embodiments of the disclosed subject matter and their practical applications, to thereby enable others skilled in the art to utilize those embodiments as well as various embodiments with various modifications as may be suited to the particular use contemplated.

The invention claimed is:

1. A computer-implemented system for presence and directional motion detection comprising:

sensors in a structure of a smart home environment, each sensor configured to detect motion in the structure and generate a signal; and

and a hub computing device configured to receive signals from a sensor of the sensors, the sensor positioned in the structure, generate an indication of directional motion based on the signals from the sensor, wherein the indication of directional motion is generated without using signals from additional sensors, in response to the indication of directional motion, generate a control signal for a device in the structure and send the control signal to the device in the structure to be implemented by the device, receive signals from sensors in the structure, identify at least one substructure of the structure based on at least one pattern of motion determined based on the signals from the sensors, and update a map of the structure based on the at least one identified substructure and the location of one or of the sensors whose signals were used to determine the at least one pattern of motion, receive signals from sensors in the structure, receive context data comprising at least the time of day, identify at least one pattern of motion based on the context data and directional motion determined from the signals from the sensors, and update a model of motion patterns with the at least one identified pattern of motion, receive additional signals from the sensors in the structure, receive additional context data comprising at least the time of day, and determine if the additional context data and directional motion determined from the additional signals corresponds to at least one pattern of motion in the model of motion patterns or diverges from the patterns of motion in the model of motion patterns, receive sensor counts from sensors in the structures, the sensors counts comprising counts that are incremented when a sensor detects a person passing in front of the sensor in a first direction and decremented when the sensor detects a person passing in front of the sensor in a second direction, collate sensor counts from sensors that monitor entryways to the same rooms to generate room counts, wherein the room count for a room is the summation of sensor counts from sensors that monitor entryways to that room, generate a second control signal for the device in the structure based on at least one of the room counts, send the second control signal to the device in the structure to be implemented by the device.

2. The computer-implemented system of claim **1**, wherein the hub computing device implements one or more machine learning systems to generate the indication of directional motion based on the signals from the sensor, identify the at least one substructure of the structure based on the at least one pattern of motion determined based on the signals from the sensors, and determine if the additional context data and directional motion determined from the additional signals corresponds to the at least one pattern of motion in the model of motion patterns or diverges from the patterns of motion in the model of motion patterns.

3. A computer-implemented method performed by a data processing apparatus comprising a hub computing device, the method comprising:

receiving, at the hub computing device, signals from a sensor positioned in a structure;